

## Claims

1. A sensitive system for detecting chemical and/or physical states or state changes within substances or mixtures of substances, characterized in that a sensitive membrane or layer (1) is disposed on or in an element (3) replaceably connectable to a cannula (2), the element with cannula (2) being introducible into a medium under measurement and forming an optical connection to an optical sensor system (4).
2. The system according to claim 1, characterized in that the optical sensor system has at least one optical detector and a light source.
3. The system according to claim 1 or 2, characterized in that the cannula is hollow throughout inside and forms an optical waveguide or at least one optical waveguide (5) is guided through.
4. The system according to any of the previous claims, characterized in that state changes within the package are detectable with the membrane or layer by interferometry, using surface plasmon resonance, spectroscopic methods or luminescence intensity change.
5. The system according to any of the previous claims, characterized in that chemical concentrations, in particular hydrocarbon concentrations, hydrogen concentrations, oxygen concentrations, water content and/or physical parameters, in particular pressure or temperature, are detectable by layer thickness changes, luminescence changes, changes of refractive index or changes of absorption, transmission, reflectivity or the change of color of the layer/membrane (1).
6. The system according to any of the previous claims, characterized in that one or more dye(s) or selective markers are contained in the membrane or layer.
7. The system according to claim 6, characterized in that the marker or dye is sensitive dependently on concentration or dependently on temperature or pressure.

8. The system according to any of the previous claims, characterized in that the connectable element has a piercing protection (8) and at least one opening (9).
9. The system according to any of the previous claims, characterized in that the connectable element (3) comprises at least one optical element (6).
10. The system according to claim 9, characterized in that the optical element (6) is a fiber optic system, a GRIN lens, an optical rod, a disk or an optical lens.
11. The system according to any of the previous claims, characterized in that the membrane/layer (1) is formed directly on/in a fiber optic system/optical system.
12. The system according to any of the previous claims, characterized in that the membrane/layer (1) is incorporated directly into the hollow cannula/needle (2).
13. The system according to any of the previous claims, characterized in that the membrane/layer (1) is incorporated directly in the hollow element (3).
14. The system according to any of the previous claims, characterized in that the membrane/layer (1) is in optical contact with a fiber optic system/optical system.
15. The system according to any of the previous claims, characterized in that the membrane/layer is applied to a filler (7).
16. The system according to any of the previous claims, characterized in that the membrane/layer is fixed on an adhesive film.
17. The system according to any of the previous claims, characterized in that calibration can be effected upon closing by a defined change of the measurand, for example by vacuum or excess pressure, supply of gas or temperature change.
18. The system according to any of the previous claims, characterized in that at least one optical or chemical protective layer(s) is applied to the membrane/layer (1).
19. The system according to claim 18, characterized in that at least one permeable metal and/or dielectric layer, lacquer layer, in particular consisting of synthetic resin lacquer or acrylic lacquer, PTFE or PTFE-based protective layer is formed.

20. The system according to any of the previous claims, characterized in that the membrane/layer (1) and/or the element (3) to be slipped on is disinfectable or sterilizable.
21. The system according to any of the previous claims, characterized in that the element (3) is adapted to be slipped or screwed onto the cannula (2).
22. The system according to claim 21, characterized in that it involves a Luer lock connection.